

## ABSTRACT

Embodiments of the present invention are directed to an architecture structured to handle unaligned memory references. In one embodiment, a method for loading unaligned data stored in a plurality of memory locations comprises loading a first part of the unaligned data into a first storage location; rotating and sign-extending the first part of the unaligned data in the first storage location from a first position to a second position; loading a second part of the unaligned data into a second storage location; rotating the second part of the unaligned data in the second storage location from a third position to a fourth position; and combining the first storage location with the second location using a logical operation into a result storage location.